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## Impact of water, sanitation and health education interventions on health and hygiene behaviors: A study from northern Pakistan

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### Abstract

**Introduction:** Water and sanitation interventions were delivered in the northern areas of Pakistan as a joint venture of the Aga Khan University and the Aga Khan Health Systems Oshikhandass Diarrhea and Dysentery Project (1989-96) followed by the Aga Khan Water, Sanitation, Health and Hygiene Studies Program (WSHHSP). Through these interventions water treatment plants, new pit latrines along with a component of health education were introduced. The objective of the study was to explore perceptions, knowledge and practices of inhabitants of Oshikhandass village in Gilgit related to water quality, latrine use and hand washing following the intervention.

**Methods:** Through an exploratory study during June-July 2012, six focus group discussions (FGDs) were conducted in various sectors of Oshikhandass supplied by filtered water (intervention area), piped water and mixed water (piped and channel water). The latter two were designated as the non-intervention areas. Participants included mothers, LHWs and youth.

**Results:** Irrespective of health education by LHWs, residents of both intervention and non-intervention communities had learnt about proper hygienic practices from daily life experiences, parents, teachers and media. LHWs role at best had been that of a positive reinforcement. Despite uniformly good awareness, intervention communities still had relatively better health and hygiene knowledge and practices as compared to non-intervention areas. Conventional practices of water purification such as using gulk as domestic filter cum refrigerator was prevalent. Non-intervention communities, however, knew that accessibility to safe water makes a difference and they would have practiced better hygiene if they had resources. Inhabitants of intervention area commented that the functionality and coverage of the filtration plant was not enough to cater to the needs of the village.

**Conclusion:** Knowledge alone is ineffective in modifying hygiene related behaviors. Sound context-specific integrated interventions for water and sanitation infrastructure development are much needed. (*Pak J Public Health* 2013;3(1):39-44)

**Keywords:** Hygiene; Behaviors; Water & sanitation; Interventions; Northern Pakistan.

### Introduction

The need for careful selection of water, sanitation, and hygiene interventions is receiving special attention in the context of the UN Millennium Development Goals and targets which aim to halve the proportion of people without sustainable access to safe water and reduce the mortality rate of children under 5 years by two thirds. All 189 UN member states have pledged to meet the Millennium Development Goals by 2015, and the UN General Assembly has given them additional weight by declaring 2005–2015 to be the “International Decade for Action—Water for Life” (1). The worldwide commitment to these goals provides an excellent opportunity to improve health and quality of life through the implementation of appropriate interventions.

Health outcomes, especially behaviors relating to hygienic practices, are influenced by socioeconomic interventions like improvement in water and sanitation facilities (2-4). An integrated package of activities aimed at

improving water supply and sanitation facilities, providing appropriate hygiene education, and building local capacity for the management of water and sanitation resources is more likely to show significant health benefits than a program that concentrates on one area alone (5-7). Global studies from developed and developing countries have revealed remarkable health improvements from water and sanitation infrastructure development along with a combination of other components such as health education most appropriate to the local context (8-10).

This study explored perceptions, knowledge and practices of inhabitants of Oshikhandass village in Gilgit city related to water quality, latrine use and hand washing following an integrated intervention named “Water, Sanitation, Health and Hygiene Studies Program (WSHHSP)” by virtue of which besides health education, water treatment plants and new latrines were introduced.

### Methods

The northern areas of Pakistan, recently renamed Gilgit-

Baltistan are a spectacular and remote, mountainous region. Oshikhandass is a village in the east of Gilgit city. It consists of about 800 households with a population of approximately 7000 individuals. 80% of the population depends on agriculture; socio-economic conditions are significantly poorer than in the rest of Pakistan. This village links Bagrot Valley and Jalalabad village to Gilgit city.

Water from glacier melt is the primary source of water; surface or untreated tap water is mainly used for consumption. Sanitation practices historically have included the use of open fields and cattle sheds for defecation (Ghizar District, parts of Gilgit District), or the use of traditional pit latrines entitled "Chaksa or Chukan" (Baltistan, Hunza); human fecal waste is naively exploited as manure for crops including vegetables/fruit without realizing the consequences. During cultivation and rainy seasons, surface water runoff and waste water from agricultural fields ingress into the channels. The main water supply of the village (muddy brown) is through the Bagrot channel (source: Bagrot Glacier). This channel drains into the Gilgit River. There is only one functional water filtration plant in the area which caters to the needs of only one third of the population while the rest of the population relies either on open channel water or a mixed type of water supply (11).

Water filtration plants were provided to different parts of the village in 1992-93 (by the Aga Khan Water, Sanitation, Health and Hygiene Studies Program (WSHHSP), and 2001 (Water and Sanitation Extension Program, WASEP). Recommendations for use of bleach to treat water were made at the time of a cholera outbreak in 1993. This was followed by the introduction in many northern villages, including Oshikhandass, of a new pit latrine (pour-flush) developed by WSHHSP.

The overall aim was to improve potable water supply at village and household level, sanitation facilities and their use, and awareness and practices about hygiene behavior. The health and hygiene education topics addressed (through weekly household & school visits by health workers) included traditional concepts about diseases; promotion of latrine use and the safe disposal of feces; domestic, environmental, and personal hygiene; food preparation, handling, and storage; transmission routes and prevention of waterborne diseases; operation and maintenance of water sources.

This project is thus a novel example of an integrated intervention encompassing components of water supply, water quality, drainage, sanitation, and school- and community-based hygiene education.

Through an exploratory study design, six focus group discussions (FGDs) were conducted in various sectors of Oshikhandass village during June-July 2012. For the purpose of this study we had discussions with residents of all three areas (i) filtered water supply area (WSHHSP intervention) (ii) open water supply area receiving water from open channels (iii) mixed water supply area which has both piped and channel water supply. The latter two were designated as non-intervention areas.

Participants included mothers (3 FGDs, with 26 participants), LHWs (1 FGD, 5 participants) and youth (2 FGDs with 9 participants each including both boys and girls).

Participants of each FGD were contacted by Lady Health Workers who were also serving as research assistants in the project. Mothers and youth who were willing were invited. FGDs were conducted in the project office of the study until thematic saturation was reached or no new information was uncovered.

The FGDs probed participants' knowledge about the benefits of safe water and sanitation measures, access to and use of water and sanitation facilities, and the barriers to better hygienic practices amongst the WSHHSP and non-WSHHSP intervention communities. After transcription key categories and themes from the participants' narratives were developed. Finally, the data were interpreted and are being presented using the respondents' own words as illustrations of a narrative. Specific observations related to health and hygiene behaviors after random selection of households were also done which will be reported in a separate study.

The study was approved by the Aga Khan University (AKU) Ethical Review Committee. Participation in FGDs was voluntary and due care was taken to ensure confidentiality of all participants.

## Results

### Health education messages

Irrespective of health education by LHWs it seems that residents of both intervention (WSHHSP) and non-intervention communities have learnt about proper hygienic practices from daily life experiences, parents, teachers and media. LHWs role at best has been that of a positive reinforcement.

*"People like to follow information they acquire from various sources as everyone desires progress. We know about "Commander Safe guard." (Youth all areas – Oshikhandass)*

LHWs on the other hand clearly highlighted during the FGDs that the receptivity of mothers to health

education was variable amongst the intervention and non-intervention areas.

*"Practices of mothers from area receiving filtered water are better because they don't have to fetch water from distant places and they listen to us". (LHWs-Oshikhandass)*

#### **Awareness about importance of safe water: quantity and quality**

The inhabitants of both WSHHSP and non WSHHP areas were equally aware about the importance of safe water supply. They said:

*"Oshikhandass is cleaner than many other places due to its green environment; the only issue is unavailability of clean water supply." (Mothers-filtered and mixed water supply area)*

*"Yes, definitely cleaner than any city. Villages are cleaner; everything is fine except the water." (Mothers -filtered and mixed water supply area)*

However there was also the realization in the WSHHSP area that mere installation of filtration plants was not enough:

*"The filtration plant is no longer working; 150-180 homes get clean water; about 70% of Oshikhandass gets dirty water." (Youth all areas – Oshikhandass)*

People from non WSHHSP areas were particularly conscious about their poor water supply:

*"Water quality is badly impaired and first filtering and then boiling is an extra burden". (Mother - open channel area)*

*"Nobody is actually motivated due to lack of resources". (Mother - open channel area)*

*"We don't have time to follow all that is told because we don't have easy access to clean water and have other domestic responsibilities. We never boil water rather let it stand for some time in traditional Gulk to settle dust particles." (Mothers - mixed and open channel areas)*

*"We have abundant water from Bagrotenala but we are not satisfied with water quality". (Mothers - open water area)*

*"We know about cleanliness and importance of wearing clean clothes but from where do we get clean water?" (Mother - open channel area)*

Residents of filtered water area (WSHHSP) were found to know exactly about the critical timings of hand washing:

*"Before cooking and feeding children, after cleaning children and wash multiple times in heat because of sweat; in cold weather we get lazy because it's too cold; sometimes use Surf to wash hands" (Mother -filtered water*

*supply area)*

#### **Realization about proper sanitation facilities**

People realized that lack of adequate toilets could be another source of contamination of water in the village:

*"Can I tell you one thing? The biggest problem is open flush 'chukan'. I tell people to stop this, but they say that it has more benefit for our crops, so why should we stop?" (Mothers - open water area)*

*"Garbage isn't a problem, we burn; mostly people don't actually burn, just throw it in the river;" (Youth all areas – Oshikhandass)*

#### **Measures for good health and hygiene at community level**

All the residents emphasized the need for creating awareness among people and providing them with clean filtered water. There was a general consensus that garbage collection methods are adequate and burning far away from home is an acceptable norm in the village however issue of clean water must be paid urgent attention. Many mothers also appreciated that since the inception of the Oshikhandass Diarrhea and Pneumonia project in 1989, cases of diarrhea and pneumonia have been reduced and children are healthier. The latter will be reported by Rasmussen et al as part of the larger ongoing surveillance study documenting incidence of diarrhea and pneumonia. However non availability of drinking water at their door steps often puts residents in difficult situations compromising their hygienic practices particularly for care takers (mothers) of young children.

*"Awareness about safe water is much needed and filtration system is very important" (Mother from filtered watered area)*

*"Filtration plant for water is most important". (Mother from mixed water supply area)*

*"I have come here after a long time period of 9 years, so I was avoiding the dirty water and try to use as much less water as possible". (Youth all areas – Oshikhandass)*

#### **Discussion**

In general, the study revealed a reasonable level of knowledge about importance of health and hygiene behaviors among the study participants belonging to both WSHHSP and non WSHHSP areas. Despite this good level of knowledge, there was a lack of motivation towards good hygienic behaviors (e.g. boiling water, proper hand washing) among residents of non-intervention areas as they did not have access to clean water, had to fetch it from nearby areas with better water supply and were also pressed for time due to other domestic chores. Among all



three sectors, residents of open channel water supply had relatively deficient knowledge and hygienic practices as compared to areas receiving water from mixed source and filtration plant. This finding is supported by other studies conducted in Bangladesh, Uganda and Kenya which show that much of the impact of improved water supply on health is mediated through increased use of water for hygienic purposes. Improvement in water and sanitation facilities have also caused remarkable reduction in incidence of diarrhea and other communicable diseases in many low socioeconomic communities of Bangladesh, East Africa and Guatemala (12-16).

It was evident that conventional practices of water purification such as using *gulk* as domestic filter cum refrigerator was quite prevalent in the community. *Gulk* is a type of pit in which channel water was stored also called *gulko* or *chudong*. Usually it is a circular, underground pit about 10 feet deep with a roof made of timber and earth. Such traditional water storage and filtration facilities were also mentioned by Muneeba et al who identified that villagers liked the *gulk* as they thought that it kept water cooler and cleaner for use (17). However during our study we found a general awareness that storing water in *Gulk* might lead to further compromising water quality for domestic use in areas where filtration facilities were not available.

Our study reinforces the fact that knowledge alone is ineffective in modifying hygiene related behaviors until accompanied by sound interventions for adequate water supply and environmental sanitation. In East African countries like Kenya and Uganda, it was found that though reliance upon particular types of surface waters was a significant determinant of diarrhea rates, having access to piped water and adequate toilet facility was significantly associated with better health outcomes in terms of diarrhea and other communicable diseases as compared to households using channel water and practicing open defecation (14). This was because despite the increase in the amount of water available per capita in un-piped households, the amount used (just over 20 l/capita/day) is hardly adequate. In particular, un-piped households use less than half the amount of water used by households with piped connections, for bathing, washing dishes, clothes and house cleaning. (18,19)

FGD results emphasized the need for context specific dry sanitation facilities for Oshikhandass which may also fulfill fertilization needs of the soil without compromising environmental sanitation. As a closed-loop system of toilets, which treats human excreta as a

resource, processing it on site until free of pathogens and then recycling for agricultural purposes has been cited as effective sanitation measure for many rural communities of the developing world. Moreover, such an approach may play an increasingly important part in provision of sanitation facilities in future especially given the fact that scarcity of water would become more pronounced (20).

Although better sensitization for critical timing of hand washing was found among WSHSP communities however hand washing with soap before performing household and feeding tasks was not a common practice among families of intervention as well as non-intervention area. This finding supports those of Curtis and Cairncross which revealed that the effectiveness of hygiene interventions in disease prevention, health considerations may be less effective at motivating people to use them than are other factors at inducing hygienic behaviors, such as the desire to feel and smell clean, and the desire to follow social norms. Therefore, Curtis and Cairncross suggest that the promotion of hand soap as a desirable consumer product may be a more effective dissemination strategy than that of health campaigns (21,22). This marketing strategy has worked in countries like Bangladesh, Burma, Indonesia and Guatemala where the risk of diarrheal disease was significantly decreased in areas where filtration plant was available (23-27). Future studies could incorporate an additional marketing component in health promotion strategies.

### Conclusion and recommendations

The paper attempts to present available information on health and hygiene behaviors of people in Oshikhandass where various water and sanitation interventions have been carried out since the last two decades.

The overall findings of this study reinforce the fact that given the good level of knowledge regarding health and hygiene practices, provision of clean water for domestic use has the potential to improve health outcomes. The study also shows that the effectiveness of hygiene education depends on the provision of improved water supply and sanitation facilities. The latter demonstrates that water, sanitation and hygiene interventions interact with one another; however the impact of each may vary widely according to local circumstances. Prioritizing such interventions should therefore be based on local conditions and needs assessment.

FGDs pointed out the need for the provision of appropriate water and sanitation facilities in nearly two thirds of the village, as current water filtration plant and

improved supply is not appropriate to cater to the needs of the entire population; thus restricting people to exercise all they want to put into practice.

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